3.15 BIOLOGICAL RESOURCES AND WETLANDS

This analysis reviews the biological resources and wetlands that may in the future require a permit and Section 404(b)(1) analysis under the federal Clean Water Act (CWA) for a proposed action, and includes sensitive plant communities and special-status species, marine and anadromous fish habitat, riparian corridors, wildlife habitats, wildlife movement corridors, wetlands, and waters. Appendix 3.15-A provides a general description of the biological resource topics. This section describes the existing biological resources and wetlands within the five project regions, and identifies the areas of potential impacts for each of the alternatives and for the high-speed train (HST) alignment and station options for these resources.

3.15.1 Regulatory Requirements and Methods of Evaluation

A. REGULATORY REQUIREMENTS

This section briefly identifies the key federal and state laws and regulations relative to biological resources. Descriptions of these laws and regulations are provided in Appendix 3.15-B.

Federal Laws and Regulations

- federal Endangered Species Act (ESA) (16 U.S.C. 1531–1543).
- CWA (33 U.S.C. 1251–1376).
- Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.).
- Fish and Wildlife Coordination Act (16 U.S.C. 661–666).
- Coastal Zone Management Act (16 U.S.C. 1456).
- Executive Order 11990, Protection of Wetlands (May 24, 1977), DOT Order 5660.1A.
- Executive Order 13112, Invasive Species (February 3, 1999).

State Laws and Regulations

- California Endangered Species Act (CESA) (Fish and Game Code 2050 *et seq.*).
- Native Plant Protection Act (Fish and Game Code § 1900–1913).
- Natural Community Conservation Planning Act (Fish and Game Code Section 2800 *et seq.*).
- Streambed Alterations (Fish and Game Code § 1601–1603).
- California Coastal Act (Public Resources Code § 30000, *et seq.*).

B. METHOD OF EVALUATION OF IMPACTS

Data Collection and Geographic Information System Mapping

The proposed Modal and HST Alternatives would cross a variety of biotic communities and could potentially result in impacts on many plant and wildlife species, and many water resources. Plant taxonomy and nomenclature follows Abrams (1923, 1944, 1951), Abrams and Ferris (1960), Buckingham et al. (1995), Hickman (1993), and Hitchcock et al. (1996). Scientific nomenclature and common names for butterflies follows Miller (1992); fish, Robins et al. (1991); herpetofauna (amphibians and reptiles), Committee on Standard English and Scientific Names (2001); birds, American Ornithologists' Union (1983, 1998); and mammals, Wilson and Cole (2000).

Geospatial data based on the California Gap Analysis Program (GAP) (Davis 1998), which uses the Wildlife Habitat Relationship (WHR) classification (Ziener et al. 1988; 1990a; 1990b), was

used as the primary source for delineation of vegetation communities along the HST and Modal Alternatives. However, the classification is based on Holland (1986). The most recent vegetation classification for California (Swayer and Deeler-Wolf 1995) was not used, as this data is not available in geospatial contexts. Geospatial data for threatened and endangered species and special-status species was obtained from the California Natural Diversity Data Base (CNDDB) (California Department of Fish and Game 2002). Information on wildlife movement corridors was obtained from the *Missing Linkages* report prepared by the California Wilderness Coalition (2000).

The type and extent of jurisdictional wetlands within the study areas came from the National Wetland Inventory (NWI) maintained by the U.S. Fish and Wildlife Service (USFWS) to provide information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. NWI digital data files are records of wetlands location and classification as developed by the USFWS. The federal Geographic Data Committee adopted this classification system as a national classification standard in 1996. The location of the wetlands is mapped on U.S. Geologic Survey (USGS) 7.5-minute topographic quadrangle maps with codes that provide information on the water body type and substrate. The NWI maps do not show all wetlands since the maps are derived from aerial photo interpretation with varying limitations due to scale, photo quality, inventory techniques, and other factors. Consequently, the maps tend to show wetlands that are readily photo-interpreted given consideration of photo and map scale. This level of information, though incomplete for some areas, provides a general overview of areas with potential sensitivity for wetland impacts that is used in the comparison of alternatives and the identification of areas where subsequent field work and wetland delineation would be conducted in the next phase of environmental evaluation, should HST be carried forward for further analysis. Wetland information, where previously mapped, is quantified to estimate the approximate acres potentially affected by the alternatives.

Digitized information for vernal pools was obtained from the California Department of Fish and Game (CDFG) and included USFWS Holland vernal pools coverage with density classes and supporting metadata file; Northern San Joaquin Valley vernal pool complexes identified by California State University, Chico; and a vernal pool species layer showing critical habitat for a suite of vernal pool species.

There were no geospatial data available for riparian corridors. The presence of streams and corresponding riparian vegetation was developed using USGS quadrangle maps, and geospatial results of the California GAP and CNDDB for specific riparian vegetation polygons.

Geographic information systems (GIS) data was exported to excel spreadsheets to show acreages of attributes for each alternative and alignment option.

A detailed description of the data collection methods is provided in Appendix 3.15-C. No field or onsite visits were made for this Program EIR/EIS. GIS files of highway, rail, and airport improvements were digitally overlaid on top of the datasets of biological resources and wetlands to identify locations where the study areas around potential alignments for proposed alternatives might include portions of sensitive biological areas. The study area was defined to encompass both direct and indirect construction-related and operational impacts.

The areas of overlap—wherever the study area included a sensitive vegetation community or habitat—were considered to constitute areas of potential impacts from the proposed alternatives. The number of reported occurrences of a particular biological resource within the study area, the linear contact of the study area with the biological resource, and acreage of the resource within the study area were counted and compiled. These results were processed into a series of frequency distributions that allowed an estimate of high, medium, or low for a potential impact.

There are inevitable inaccuracies and gaps in the statewide and federal datasets and vegetation data layers due to differences in collection methods, dates the data was first collected, changes in habitat conditions, and myriad other factors. For the scale of analysis for this Program EIR/EIS, these available data sources are considered appropriate to identify key differences between proposed alternatives and potential alignment options. Given the datasets, the lack of identification of an impact does not necessarily mean that this portion of the proposed alternative would not result in potential impacts on biological resources, only that location-specific data would be required to make a more precise determination. Likewise, the identification of a potential impact on a specific resource is intended to be conservative and in some instances may be an overstatement, because neither habitat that is sensitive nor species of concern may be found in or near the footprint of the proposed corridor or actual alignment. Verification of potential impacts would require future location-specific study and evaluation to determine the level and extent of potential impact. This level of analysis would be part of a subsequent stage of environmental review.

C. SIGNIFICANCE CRITERIA FOR BIOLOGICAL RESOURCES

The significance criteria for identifying potential impacts on biological resources from proposed projects/actions are based on federal and state guidelines and general indicators of significance, including guidelines or criteria in NEPA, CEQA, CWA, CESA, ESA, and California Fish and Game Code. Project-specific criteria would be applied at the project level of environmental analysis when permits are being sought, if a decision is made to proceed with a proposed HST following this program-level analysis.

Based on the presence or absence of sensitive resources, an alternative may have a considerable impact on biological resources if its implementation would result in any of the following.

- Potential modification or destruction of habitat, movement/migration corridors, or breeding areas of endangered, threatened, rare, or other species as described above.
- Potential loss of a substantial number of any species that could affect the abundance or diversity of that species beyond the level of normal variability.
- Potential impacts on or measurable degradation of protected habitats; sensitive natural vegetation communities; wetlands; or other habitat areas' plans, policies, or regulations.
- Potential conflict with the provisions of an adopted habitat conservation plan (HCP), natural community conservation plan[1] (NCCP), or other approved local, regional, or state habitat conservation plan.
- Potential conflict with local ordinances protecting biological resources, such as a tree or creek preservation policy or ordinance.

3.15.2 Affected Environment

A. STUDY AREA DEFINED

The biological resources study area for the analysis of alternatives, including the various alignments and station options, is defined by the following limits, unless otherwise noted.

- 1,000 ft (305 m) on either side of alignment centerlines and around stations in urbanized areas.

[1] The NCCP program of CDFG is an effort by the State of California and many private and public partners that takes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity. An NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. CDFG and USFWS provide the necessary support, direction, and guidance to NCCP participants in these functions.

- 0.25 mi (0.40 km) on either side of alignment centerlines and around stations in undeveloped areas.
- 0.50 mi (0.81 km) on either side of alignment centerlines and around stations in sensitive areas.

To account for potential indirect impacts on biological resources that could result from project-related noise, light, or shadows, as well as other disruption to or physical separation of habitat areas, the biological resources study area is larger than the footprint of either the Modal or HST Alternative, which would be between 50 ft (15 m) and 100 ft (30 m). The largest study area in sensitive habitat (0.50 mi [0.81 km] either side of the centerline, or a 1-mi-wide [1.6-km-wide] corridor), such as lagoons in the San Diego region, is used to capture potential indirect impacts on migrating birds and other wildlife that use these areas for nesting or foraging for food. At this program level of analysis, this approach provides opportunities to focus on broad areas of potential impact where field studies would be conducted to help direct where alignment or project profile changes could be made during the subsequent phase of project design to avoid or minimize impacts on sensitive resources (habitat area). The smallest study area (1,000 ft [305 m] on either side of an alignment centerline) applies to alignments/corridors in urbanized areas where biological resources are limited to localized instances (creek crossings, urban parks, and open space). The 0.25-mi [0.40-km] area was used to encompass natural undisturbed resources that could be subject to indirect impacts from noise, erosion, storm water runoff, or other effects of construction or operation of the alternatives.

The study area varied by region based on the technical analysts' judgment of the sensitivity of the biological resources in the region, and in some cases to allow for future flexibility with alignment plans where the proposed alignment is not in an existing rail or highway right-of-way. The study area used for each of the five regions is described below.

Bay Area to Merced

On the Bay side of the alignments along San Francisco Bay, the 1,000-ft (305-m) study area width was reduced to 100 ft (30 m) because local, state, and federal agencies (including the San Francisco Bay Conservation and Development Commission, State Lands Commission, and U.S. Army Corps of Engineers [USACE]) would generally not permit or would severely restrict additional fill in the Bay. Away from the Bay side, the study area was 1,000 ft (305 m) on either side of the centerline of highway and rail corridors (i.e., a corridor totaling 2,000 ft, or 710 m).

Sacramento to Bakersfield

The study area in this region was 1,000 ft (305 m) on either side of alignment/corridor centerlines, around stations, and in developed areas, and 0.25 mi (0.40 km) on either side of the centerline in undeveloped areas. The smaller study area was used where alignments were within or parallel to existing rail or highway transportation right-of-way.

Bakersfield to Los Angeles

The study area in this region was 0.5 mi (0.8 km) on either side of highway and rail corridors and around stations. The broader study area was used in this region primarily because of the Tehachapi mountain crossings in undeveloped areas.

Los Angeles to San Diego via Inland Empire

In this region, the study area was 1,000 ft (305 m) on both sides of Modal and HST alignments/corridors in developed areas, and 0.25 mi (0.40 km) around stations and on both sides of corridors in undeveloped areas.

Los Angeles to San Diego via Orange County

Other than the undeveloped area of Camp Pendleton and several other small open areas, most of the study area in this region is designated by Census data as urbanized. Thus, most of the analysis used 1,000 ft (305 m) on either side of the centerline, or a corridor totaling 2,000 ft (710 m). Because of the sensitive nature of the six lagoons, the surrounding study areas were 1.0-mi (1.6-km) wide. In addition, all undeveloped areas within this region are considered sensitive; therefore, the study area was either 0.50 mi (0.8 km) or 1.0 mi (1.6 km) on either side of the centerline.

B. GENERAL DISCUSSION OF BIOLOGICAL RESOURCES AND WETLANDS

Following is a brief description of the resource topics reviewed in this section. A more detailed description of these resources and the sources of information used to obtain the descriptions are provided in Appendix 3.15-A. In addition, this section discusses HCPs, critical habitat[2] areas, and other conservation plans or areas that could potentially be affected by one or more of the alternatives discussed in this document.

Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities (assemblages of species, both plant and wildlife, forming communities) and wildlife habitats that are unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local government conservation programs.

Sensitive Plant Species

Sensitive plant species include plant species that have been afforded special status and/or recognition by federal and state resource agencies, as well as private conservation organizations, because of documented or perceived decline or limitation of population size or geographical extent.

Sensitive Wildlife Species

Sensitive wildlife species include wildlife species that have been afforded special status and/or recognition by federal and state resource agencies, as well as private conservation organizations, because of documented or perceived decline or limitation of population size or geographical extent. Special-status species include wildlife, fish, or animals that are legally protected, or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status species include species listed as state and/or federal threatened or endangered species under ESA or CESA, those considered as candidates for listing, and species identified by USFWS and/or CDFG as California species of special concern.

Wildlife Movement/Migration Corridors

Wildlife movement/migration corridors link together areas of wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization tends to create isolated islands of wildlife habitat.

Water Resources

Lakes, rivers, streams, and other water bodies are protected by federal and/or state law. Special aquatic sites, which include wetlands, are considered an important subset of these waters. Wetlands and certain other waters would be delineated as part of a subsequent environmental review process.

[2] Critical habitat refers to areas shown on maps developed by USFWS that provide habitat for threatened and endangered species.

C. BIOLOGICAL RESOURCES AND WETLANDS BY REGION

Following is a brief discussion of resources within each of the five regions for the topics described above.

Bay Area to Merced

This region includes central California from the San Francisco Bay Area (San Francisco and Oakland) south to the Santa Clara Valley and east across the Diablo Range to the Central Valley. The area traversed by the alternatives is dominated by three principal geophysical features: the San Francisco Bay and coastal valleys, including the Santa Clara Valley and the Bolsa; the Diablo Range; and the Central Valley. The three major watersheds that correspond to the three principal geophysical features are the San Francisco Bay watershed, Pajaro River watershed, and San Joaquin River watershed. Elevation along the proposed HST alignment options in this region ranges from sea level to nearly 5,000 ft (1,524 m).

Vegetation communities generally found along the proposed HST alignment options from the Bay Area to Merced are varied. Major biological communities include blue oaks (*Quercus Douglasii)* and/or foothill pine (*Pinus sabiniana)* woodlands; chaparrals (*Adenostoma fasciculatum)* and montane hardwoods (*Cercocarpus betuloides);* chenopod scrubs, including alkali desert scrub; coastal oak woodlands-scrub oak (*Quercus berberidifolia);* interior live oak (*Quercus wislizenii);* coast live oak (*Quercus agrifolia);* valley oak (*Quercus lobata);* coastal salt marsh (northern coastal type); coastal scrubs (Diablan coastal scrub); freshwater marsh, including emergent wetland and cismontane alkali marsh; nonnative grasslands, including annual grassland and valley and foothill grassland; riparian woodlands; and valley oak woodland.

The 28,000-acre (ac) (11,331-hectare [ha]) Don Edwards San Francisco Bay National Wildlife Refuge, which is located in the region on the southeast side of the San Francisco Bay, is the largest urban wildlife refuge in the nation. It is home to millions of shorebirds and waterfowl, with a total of 250 bird species, including the endangered California clapper rail (*Rallus longirostris obsoletus)*. Another special-status species in the refuge is the salt marsh harvest mouse (*Reithrodontomys raviventris)*. The Mount Hamilton Project of The Nature Conservancy encompasses a 1,560-sq-mi (2,511-sq-km) area in this region that extends from south of the Pacheco Pass to north of the Altamont Pass, with large parts of the area protected by conservation easements. The South Bay Salt Pond Restoration Project, a 25-sq-mi (65-sq-km) project to restore the wetlands from the San Mateo Bridge to the southern edge of the Bay, was initiated by the California Coastal Conservancy, USFWS, and CDFG in 2003. The Henry Coe State Park located northeast of Gilroy is a 79,149-ac (32,031-ha) park and a 23,300-ac (9,429-ha) wilderness area (Orestimba Wilderness Area) that is home to a variety of special-status species and wildlife, including an estimated 675 vascular plants.

Sensitive Vegetation Communities: The natural communities of special concern in this region are central coast cottonwood-sycamore riparian forest, cismontane alkali marsh, northern coastal salt marsh, northern hardpan vernal pool, serpentine bunchgrass, sycamore alluvial woodland, valley oak woodland, and valley sink scrub. The Mount Hamilton Project area contains valley oak savanna and blue oak woodlands, and supports diverse animal life.

When cross-referenced with the Wildlife Habitat Relationships System,[3] sensitive vegetation communities were identified along the project alignment options from the California GAP GIS database, including alkali desert scrub (also known as chenopod scrubs), freshwater emergent wetland, lacustrine habitat, valley oak woodland, and valley-foothill riparian woodland.

[3] The Wildlife Habitat Relationship (WHR) was developed by CDFG and is used as a classification system (Zeiner *et al.* 1988, 1990a, 1990b).

Sensitive Plant Species: Nearly 70 special-status plant species have the potential to occur in this region, including those indigenous to vernal pools, chenopod scrubs, cismontane woodlands, coastal salt marsh, and serpentine substrates. Examples include large-flowered fiddleneck (*Amsinckia grandiflora),* succulent owl's clover (*Castilleja campestris* ssp*. Succulenta),* palmate-bracted bird's beak (*Cordylanthus palmatus),* and Boggs Lake hedge-hyssop (*Gratiola heterosepala)*. A complete listing of sensitive plant species in this region is included as part of the biological resources technical evaluation for the Bay Area to Merced region.

Sensitive Wildlife Species: More than 98 special-status wildlife species have the potential to occur in this region, including more than 20 special-status invertebrate species, six special-status fish species, 12 special-status reptiles and amphibians, more than 40 special-status bird species, and more than 20 special-status mammal species. These species include several fairy shrimp; vernal pool fairy shrimp (*Branchinecta lynchi);* three species of steelhead: Central Valley, Central California coast, and South Central California (*Oncorhynchus mykiss);* Sacramento splittail (*Pogonichthys macrolepidotus);* California tiger salamander (*Ambystoma californiense);* California red-legged frog *(Rana aurora daytonii);* blunt-nosed leopard lizard *(Gambelia silus);* Alameda whipsnake *(Masticophis lateralis euryxanthus);* giant garter snake *(Thamnophis gigas);* San Francisco garter snake *(Thamnophis sirtalis tetrataenia);* California brown pelican *(Pelecanus occidentalis californicus);* American peregrine falcon *(Falso peregrinus anatum);* California black rail *(Laterallus jamaicensis coturniculus);* California clapper rail *(Rallus longirostris obsoletus);* least Bell's vireo *(Vireo bellii pursillus);* salt marsh harvest mouse *(Reithrodontomys raviventris);* and San Joaquin kit fox *(Vulpes macrotis mutica).* In addition, southwestern pond turtle *(Clemmys marmorata pallidus)* and western burrowing owl *(Athene cunicularia hypugaea)* have the potential to occur in the Mount Hamilton Project area.

Wildlife Movement/Migration Corridors: While there are limited data available on wildlife movement/migration corridors in this region, all of the major riparian and stream corridors of the canyons of the Diablo Range provide corridors for wildlife movement. In addition, many streams and major rivers of the region are fish migration corridors used by anadromous and freshwater species. Further, on the west side of the Central Valley, the relatively extensive strip about 10-mi (16-km) wide of annual (nonnative) grassland that lies between the irrigated fields and orchards of the valley floor and the oak and pine woodlands of the Diablo Range provides a movement corridor for the San Joaquin kit fox *(Vulpes macrotis muticsa)*.

Water Resources: In the Bay Area to Merced region, wetlands and water resources include most of the major ecological types found in California (i.e., bays, rivers, streams, lakes, ponds, springs, seeps, and marshes). Following the ecologically based Cowardin system of wetland classification, the main types of wetlands along the alignments of the proposed alternatives in this region include estuarine, lacustrine, palustrine, and riverine systems. Vernal pools may be present, specifically on Clear Lake soils fringing San Francisco Bay, or on Central Valley terrace deposits (see Figure 3.15-1).

CDFG's habitat-based California Wildlife Habitat Relationships system catalogues both freshwater emergent wetland and lacustrine wetland types. Following the floristically based Holland system of classification, the major wetland types in the study area for this region are cismontane alkali marsh, freshwater emergent marsh, northern coastal salt marsh, and northern hardpan vernal pool.

Conservation Plans: A restoration plan is being developed by the California Coastal Conservancy, USFWS, and CDFG for the Cargill salt properties (South Bay Salt Pond Restoration Project) to restore salt marshes, as well as to provide public access and public recreation. Critical habitat may be proposed for the tiger salamander, which USFWS has recently proposed for listing and whose habitat areas include the western foothills of the Central Valley, through the Diablo Range

crossing to Gilroy. The Nature Conservancy is pursuing conservation measures to protect more than 780 square mi (2,020 square km) of land in the Diablo Range to safeguard native species and natural habitats. This project was started in 1998 with the largest single private conservation project in northern California history—involving two ranches east of Mount Hamilton totaling 61,000 ac (24,686 ha). The Nature Conservancy's goal is to protect some 200,000 ac (80,937 ha) by 2007. This area would protect the San Joaquin kit fox, the California red-legged frog, valley oak savannas, blue oak woodlands, and native fish and amphibians.

Sacramento to Bakersfield

Regional Summary: This region of central California includes a large portion of the Central Valley (San Joaquin Valley) from Sacramento south to Bakersfield. The study area for the Sacramento to Bakersfield region crosses many different ecosystems: native and introduced plant communities; permanent and seasonal streams and rivers with associated riparian communities; and seasonal wetlands, vernal pools, and other waters. In addition, biological communities are found in lands in agricultural use, including row crops, nut orchards, vineyards, and other cultivated lands.

Between Sacramento and Bakersfield, the Central Valley crosses a relatively flat plain that historically supported lush stands of riparian vegetation, extensive wetlands, and a plethora of wildlife. Since colonization by European settlers, river channeling and flood control efforts, and the introduction of agriculture have changed this plain dramatically. Today this portion of the Central Valley supports a multitude of agricultural activities and is home to many people. This has resulted in the removal of native vegetation communities, the draining of wetlands, and a reduction in wildlife distribution and abundance. While urbanization and agriculture have reduced the abundance of native habitats, habitat areas still exist, often supporting sensitive plants and animals. Vegetation data for the study area in the region indicate that 13 vegetation communities can be found in the Central Valley between Sacramento and Bakersfield. (Lake and river categories are not included in this total.) The largest area, more than 185,000 ac (74,867 ha), is covered by agricultural lands; the smallest area, approximately 10 ac (4 ha), is covered by blue oak woodland.

More than two dozen major rivers flow within the study area in this region, generally heading from east to west, including the Consumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, Fresno, San Joaquin, Kings, Kawaeah, Tule, and Kern Rivers.

Sensitive Vegetation Communities: There are five types of sensitive vegetation communities found in this region: Central Valley cottonwood riparian forest, Central Valley oak riparian forest, northern hardpan vernal pool, northern claypan vernal pool, and valley sink scrub.

Sensitive Plant Species: There is potential for 29 sensitive plant species to occur in the region based on a review of the CNDDB prepared by CDFG. Twenty-eight are federally and state-listed species, and one is a California Native Plant Society (CNPS) List 1B species.[4] Among the sensitive plant species in this region are Ferris's milkvetch (*Astragalus tener* var*. ferrisiae)*, alkali milkvetch (*Astragalus tener* var*. tener),* Heartscale (*Atriplex cordulata),* brittlescale (*Atriplex depressa),* San Juaquin saltbush (*Atriplex joaquiniana),* Bakersfield smallscale (*Atriplex tularenses),* subtle orache (*Atriplex subtilis),* lost hills crownscale (*Atriplex vallicola),* big tarplant (*Blepharizonia plumose* ssp*. Plumose),* California jewelflower (*Caulanthus californicus),* slough thistle (*Cirsium crassicaule),* Mt Hamilton thistle (*Cirsium frontinale* var*. campylon),* hispid bird's beak (*Cordylanthus mollis* ssp*. Hispidus),* recurved larkspur (*Delphinium recurvatum),* Bogg's Lake hedge-hyssop (*Gratiola heterosepala),* Coulter's goldfields (*Lasthenia glabrata* ssp*. Coulter),*

[4] CNPS listing considered rare or endangered in California and elsewhere in their range, or extinct in California, 2001.

Comanche Point Layia (*Layia leucopappa),* Munz's tidy tips (*Layia munzii),* legenere (*Legenere limosa),* Madera Linanthus (*Linanthus serrulatus),* Merced Monardella (*Monardella leucocephala),* San Jouquin Wollythreads (*Monolopia congdonii),* Bakersfield cactus (*Optunia basilaris* var*. treleasei),* San Joaquin Valley Orcutt grass (*Orcuttia inaequalis),* hairy orcutt grass (*Orcuttia pilosa),* Merced Phacelia (*Phacelia ciliata* var*. opaca),* San Joaquin Adobe Sunburst (*Pseudobahia peirsonii),* Sanford's Arowhead (*Sagittaria sanfordii),* Creene's tuctoria (*Tuctoria greenei).*

Sensitive Wildlife Species: More than 14 special-status wildlife species have the potential to occur in the study area in this region based on the general types of habitat present. These include vernal pool fairy shrimp *(Branchinecta lynchi);* valley elderberry longhorn beetle *(Desmocerus californicus dimorphus);* vernal pool tadpole shrimp *(Lepidurus packardi);* Sacramento splittail *(Pogonichthys macrolepidotus);* four runs of chinook salmon *(Oncorhynchus tshawytscha),* divided into three different Evolutionarily Significant Units, or ESUs; steelhead *(Oncorhynchus mykiss);* California tiger salamander *(Ambystoma californiense);* blunt-nosed leopard lizard *(Gambelia sila);* giant garter snake *(Thamnophis gigas);* Swainson's hawk *(Buteo swainsoni);* bank swallows *(Riparia riparia);* Fresno kangaroo rat *(Dipodomys nitratoides exilis);* Tipton kangaroo rat *(Dipodomys nitratoides nitratoides);* and San Joaquin kit fox *(Vulpes macrotis mutica)*.

Wildlife Movement/Migration Corridors: There is little available data on wildlife movement corridors within the study area in this region. Intensive agricultural activities have reduced the available native habitats. Existing infrastructure, such as roads, rail lines, and aqueducts, has fragmented habitat and reduced migration corridors. The San Joaquin kit fox has been known to inhabit areas on the San Joaquin Valley floor in Kern, Tulare, Kings, Fresno, Madera, San Benito, Merced, Stanislaus, and San Joaquin Counties, and in the surrounding foothills of the Coastal Ranges.

Water Resources: The Sacramento to Bakersfield region contains wetlands and other water bodies, including lakes and open water systems, aquatic beds, emergent wetlands, scrub wetlands, unvegetated wetlands, tidal waters, rivers, perennial streams, intermittent streams, and vernal pools.

Conservation Plans: The alternatives and HST alignment options between Sacramento and Bakersfield would cross through several HCP and NCCP planning areas, including the eastern Merced County NCCP/HCP and the Kern Valley Floor multi-species HCP. The Kern County Valley Floor HCP, which is in draft form, will cover 3,110 sq mi (5,005 sq km), located 20 mi (32 km) west of Bakersfield. It will include all of Kern County below 200 ft (61 m) elevation and on the valley floor. The plan is proposed to address eight species, including Bakersfield cactus, blunt-nosed leopard lizard, San Joaquin kit fox, and Tipton kangaroo rat. 36 NCCP/HCPs are reported within the San Joaquin Bioregion.

Bakersfield to Los Angeles

Regional Summary: This region of southern California encompasses the southern portion of the Central Valley south of Bakersfield, the mountainous areas between the Central Valley and the Los Angeles basin, and the northern portion of the Los Angeles basin from Sylmar to downtown Los Angeles. The widely varying topography of this region comprises mountainous regions with steep ridges, valleys, and flat plains. The northwestern portion of the study area in this region is located in the San Joaquin Valley, a valley characterized by a flat plain that extends east to the Tejon Mountains, which run approximately north to south. The plain extends south and the elevation abruptly rises into the San Gabriel Mountains, which run west to east, in the central portion of the study area. The San Gabriel Mountains gradually decline into the flat Los Angeles basin in the southern portion of the study area. Between the Tehachapi Mountains and the San Gabriel Mountains in the eastern portion of the study area is the Antelope Valley, a valley

characterized by a flat plain dotted with isolated peaks. The City of Tehachapi is located in a flat valley between the Tejon Mountains and the Tehachapi Mountains, which also run north to south. The study area in this region ranges in elevation from 250 ft (76 m) to 5,600 ft (1,707 m).

Major watercourses are located throughout the study area in this region. Pyramid Lake and Castic Lake are located in the west along I-5. Lake Palmdale and Una Lake are located in the east near Sierra Highway. The Santa Clara River traverses the south-central portion of the study area through Soledad Canyon. The Los Angeles River winds through the City of Los Angeles in the southernmost part of the study area.

There are 14 major vegetation communities in the study area in this region: urban/developed, agriculture, chaparral, coastal sage scrub, oak woodland and forest, valley grassland, creosote scrub brush, desert saltbush scrub, foothill pine-oak woodland, montane coniferous forest, piñon-juniper woodland, riparian woodland, freshwater marsh, and Mojave mixed woody scrub.

Sensitive Vegetation Communities: Sensitive vegetation communities found in this region include California walnut woodland, mainland cherry forest, riversidean alluvial fan sage scrub, southern coast live oak riparian forest, southern cottonwood-willow riparian forest, southern riparian scrub, southern sycamore-alder riparian woodland, southern willow scrub, stabilized interior dunes, valley needlegrass grassland, valley oak woodland, valley saltbush scrub, and wildflower fields.

Sensitive Plant Species: A total of 29 CNPS List 1B plants and 14 federally and state-listed species have the potential to occur in the study area in this region. Specific species include Mt. Pinos onion (*(Allium* howellii var. clokeyi), San Gabriel manzanita *(Arctostaphylos gabrielensis),* Kusche's sandwort *(Arenaria macradenia* var*. kuschei),* Greata's aster *(Aster greatae),* Braunton's milk-vetch *(Astragalus brauntonii)),* Lancaster milk-vetch *(Astragalus preussii* var*. laxiflorus),* Parish's brittlescale *(Atriplex parishii),* Davidson's saltscale *(Atriplex serenana* var*. davidsonii),* Bakersfield smallscale *(Atriplex tularensis),* Nevin's barberry *(Berberis nevinii),* Palmer's mariposa lily *(Calochortus palmeri* var*. palmeri),* Plummer's mariposa lily *(Calochortus plummerae),* Alkali mariposa lily *(Calochortus striatus),* Mt. Gleason Indian paintbrush *(Castilleja gleasonii),* Southern tarplant *(Centromadia parryi* ssp*. Australis),* San Fernando Valley spineflower *(Chorizanthe parryi* var*. Fernandina),* Parry's spineflower *(Chorizanthe parryi* var*. parryi),* Santa Susana tarplant *(Deinandra minthornii),* recurved larkspur *(Delphinum recurvatum),* slender-horned spineflower *(Dodecahema leptoceras),* many-stemmed dudleya *(Dudleya multicaulis),* Ft. Tejon wooly sunflower, *(Eriophyllum lanatum* var*. hallii),* Tejon poppy *(Eschscholzia lemmonii* ssp*. Kernensis),* Mesa horkelia *(Horkelia cuneata* ssp. *puberual),* Comanche point layia *(layia leucopappa),* sagebrush loeflingia *(Loeflingia squarrosa* var*. artemisiarum),* Davidson's bush mallow *(Malacothamnus davidsonii),* Calico monkeyflower *(Mimulus pictus),* Flax-like monardella *(Monardella linoides* ssp*. Oblonga),* San Joaquin woollythreads *(Monolopia congdonii),* Plute Mountains navarretia *(Navarretia setiloba),* short-joint beavertail *(Opuntia basilaris* var*. brachyclada),* Bakersfield cactus *(Opuntia basilaris* var*. treleasei),* California Orcutt grass *(Orcuttia californica),* Plute mountains jewel-flower *(Streptanthus cordatus* var*. piutensis),* Mason's neststraw *(Stylocline masonii)*.

Sensitive Wildlife Species: Forty-five special-status wildlife species have the potential to occur in the study area in this region based on the general types of habitat present. These include four special-status fish species, 13 special-status reptiles and amphibians, 20 special-status bird species, and eight special-status mammal species. Specific species include arroyo chub *(Gila orcutti)*, Santa Ana sucker *(Catostomus santaanae),* steelhead—Southern California ESU—*(Oncorhynchus mykiss irideus),* unarmored threespine stickleback *(Casterosteus aculeatus williamsoni)*, San Diego horned lizard *(Phrynosoma coronatum blainvillii)*, arroyo toad *(Bufo californicus)*, Tehachapi slender salamander *(Batrachoseps stebbinsi)*, western spadefoot *(Spea*

hammondii), two-striped garter snake *(Thamnophis hammondii)*, blunt-nosed leopard lizard *(Gambelia sila)*, San Bernardino mountain kingsnake *(Lampropeltis zonata parvarubra)*, California horned lizard *(Phrynosoma coronatum frontale)*, California red-legged frog *(Rana aurora draytonii)*, coast patch-nosed snake *(Salvadora hexalepis virgultea)*, coast range newt *(Taricha torosa torosa)*, silvery (California) legless lizard *(Anniella pulchra pulchra)*, western pond turtle *(Clemmys marmorata)*, Le Conte's thrasher *(Toxostoma lecontei)*, least Bell's vireo *(Vireo bellii pusillus)*, California condor (*Gymnogyps californianus*), Cooper's hawk *(Accipiter cooperii)*, Swainson's hawk *(Buteo swainsoni)*, western yellow-billed cuckoo *(Coccyzus americanus occidentalis)*, coastal California gnatcatcher *(Polioptia californica californica)*, loggerhead shrike *(Lanius ludovicianus)*, northern harrier *(Circus cyaneus)*, prairie falcon *(Falco mexicanus)*, Southern California rufous-crowned sparrow *(Aimophila ruficeps canescens)*, southwestern willow flycatcher *(Empidonax traillii extimus)*, summer tanager species *(Piranga rubra)*, merlin *(Falco columbarius)*, Bell's sage sparrow *(Amphispiza Bellii bellii)*, coastal cactus wren *(Campylorhynchus brunneicapillus couesi)*, ferruginous hawk *(Buteo regalis)*, golden eagle *(Aquila chrysaetos)*, tricolored blackbird *(Agelaius tricolor)*, burrowing owl *(Athene cunicularia)*, San Joaquin kit fox *(Vulpes macrotis mutica)*, Tehachapi pocket mouse *(Perognathus alticola inexpectatus)*, Mohave ground squirrel *(Spermophilus mohavensis)*, San Joaquin antelope squirrel *(ammospermophilus nelsoni)*, San Joaquin pocket mouse *(Perognathus inornatus inornatus)*, Tipton kangaroo rat *(Dipodomys nitratoides)*, San Diego desert woodrat *(Neotoma lepida intermedia)*, and Los Angeles pocket mouse *(Perognathus longimembris brevinasus)*.

Wildlife Movement/Migration Corridors: The South End San Joaquin Valley corridor allows movement of wildlife from the Los Padres National Forest to the Tehachapi Mountains and El Tejon Mountains and into the Sequoia National Forest. San Joaquin kit fox, short-nosed kangaroo rat, blunt-nosed leopard lizard, and Le Conte's thrasher are species used to characterize this corridor and are indicative of its habitat connectivity. SR-58, I-5, and gaps in vegetation cover along I-5, as well as the steep and hilly terrain of the area, pose significant barriers to animal movement in the corridor. Bridges, underpasses, and some continuous habitat located along and within this corridor facilitate animal movement.

The Southern Sierra corridor connects the Los Padres National Forest and the Angeles National Forest just south of the I-5 and SR-99 interchange. This corridor allows movement throughout the Tehachapi mountain range and crosses SR-58. Deer, bear, mountain lion, and bobcat are key species used to characterize this corridor and are indicative of its habitat connectivity. SR-58 and other roadways are significant barriers to animal movement in the corridor.

The San Gabriel-Tehachapi corridor connects the Angeles National Forest and the Tehachapi Mountains. Animal movement in the corridor is significantly impeded by private lands, agriculture, and existing development in the area. Existing California Department of Parks and Recreation and CDFG lands facilitate animal movement in the corridor.

The Castaic I-5 undercrossing corridor connects Los Padres National Forest with Angeles National Forest near Castaic Lake. Significant barriers to animal movement associated with the corridor area are SR-126 and I-5. Existing riparian habitat, underpasses, and bridges facilitate animal movement in the corridor.

The Soledad Canyon–Mint Canyon corridor allows movement throughout the Angeles National Forest. Mammals, three-spine stickleback, southwestern willow flycatcher, and western spadefoot are key species used to identify the corridor. SR-14 is the only significant impediment to animal movement in the corridor. The Santa Clara River and the Angeles and Los Padres National Forests facilitate animal movement through the corridor.

The Santa Clara River corridor allows movement along the Santa Clara River from the Pacific Ocean to the Angeles National Forest. Fish and birds are the key species used to characterize the corridor and are indicative of its habitat connectivity. Gaps in vegetation cover are significant barriers to animal movement in the corridor. Existing features facilitating animal movement through the corridor include riparian habitat and an absence of dams.

The I-5 Newhall Pass corridor allows movement from hills west of I-5 south of the I-5/SR-14 interchange to the Angeles National Forest. All San Gabriel Mountain mammals, mountain lions, bobcat, gray fox, deer, coyote, and black bear are key species used to characterize the corridor and are indicative of its habitat connectivity. Significant barriers to animal movement in the corridor are SR-14 and I-5. Existing features that facilitate animal movement through the corridor include the Los Pinetos SR-14 undercrossing (disturbed coast live oak woodland), the Gavin Canyon I-5 crossing (disturbed coast live oak woodland), and the I-5 Weldon Canyon overpass (road cut with buckwheat).

Water Resources: This is a diverse region that includes several types of waters and wetlands. These waters range from concrete-lined urban streams, reservoirs, and agricultural ditches to natural rivers, desert washes, and mountain lakes. The water and/or wetland system present in each area depends on a variety of factors, including substrate, groundwater levels, precipitation, topography, and human-made improvements. Lacustrine systems in the region include Castaic Lake and Palmdale Lake. Palustrine features include ponds and non-tidal wetlands dominated by trees, shrubs, mosses, or lichens, as well as vegetated wetlands traditionally referred to as marshes, swamps, bogs, fens, and prairie potholes. Riverine systems in the study area in the region include the Los Angeles River, the Santa Clara River, and several tributaries.

Conservation Plans: The Kern County Metropolitan-Bakersfield HCP, which covers 405 sq mi (652 sq km), is one of California's largest and most successful multi-species habitat conservation plans (MSHCPs). The plan was approved in 1994 to aid 13 federally and state-listed plant and wildlife species, including the San Joaquin kit fox, San Joaquin antelope squirrel, blunt-nosed leopard lizard, Tipton kangaroo rat, Bakersfield cactus, and California jewel-flower.

The Kern County Valley Floor HCP, which is in draft form, will cover 3,110 sq mi (5,005 sq km), located 20 mi (32 km) west of Bakersfield. It will include all of Kern County below 200 ft (61 m) elevation and on the valley floor. The plan will address eight species, including Bakersfield cactus, blunt-nosed leopard lizard, San Joaquin kit fox, and Tipton kangaroo rat.

The Coles Levee Ecosystem Reserve and the Kern Water Bank Authority, two existing conservation banks in Kern County, have established mitigation credits for valley saltbush scrub, valley sink scrub, Great Valley cottonwood riparian, and vernal playas, and support habitat for San Joaquin kit fox, Tipton kangaroo rat, blunt-nosed leopard lizard, and Swainson's hawk. Two other conservation banks under development in Kern County—the Chevron Lokern Conservation Bank and the Lost Hills District Mitigation Bank—will establish mitigation credits for San Joaquin Valley saltbush scrub, valley sink scrub, Great Valley cottonwood riparian, and vernal playas, and support habitat for Bakersfield saltbush (smallscale), Bakersfield cactus, San Joaquin kit fox, blunt-nosed leopard lizard, Tipton kangaroo rat, Swainson's hawk, and San Joaquin wooly-threads.

Los Angeles to San Diego via Inland Empire

Regional Summary: This region of southern California includes the eastern portion of the Los Angeles basin from downtown Los Angeles east to the Riverside and San Bernardino areas, and south to San Diego generally along the I-215 and I-15 corridors. The dominant land use pattern from Los Angeles Union Station (LAUS) to Ontario Airport consists of heavily developed and urbanized settings. Except for small patches of annual grasslands and coastal sage communities,

there are no contiguous natural communities along this segment. In the north-south orientation, the land cover is generally dominated by a patchwork of agricultural land use (orchards and vineyards) and urban areas along the I-215 corridor. Orchards and vineyards dominate south of the San Luis Rey River until north of Escondido. South of Lake Hodges, the land use is predominantly urban. South of Carroll Canyon toward the City of San Diego, Mission Bay, and San Diego Bay, the land use is heavily urban.

The topography along the entire corridor in the east-west orientation, from LAUS to March Air Reserve Base (ARB) segment, is generally flat. The terrain remains relatively flat through Riverside and heading into Perris Valley and Sun City, and becomes relatively steep south of Murrieta and Temecula Valley and further south towards Rainbow Valley. The terrain continues to be relatively steep until Escondido, along the north-south orientation, adjacent to the I-215 corridor. The terrain is also steep near the proposed Mira Mesa station and further south of Carroll Canyon.

Vegetation communities in the study area in this region include annual (nonnative) grasslands, coastal sage scrub, chamise redshank chaparral/mixed chaparral, southern cottonwood willow riparian, southern sycamore-alder riparian woodland, riparian scrub oak, orchards and vineyards, lacustrine wetlands, vernal pools, San Jacinto Valley vernal pools, and San Diego Mesa hardpan vernal pools.

Sensitive Vegetation Communities: The sensitive vegetation communities in this study area include annual grasslands, coastal sage scrub, chamise redshank chaparral/mixed chaparral, southern riparian forest that includes southern cottonwood willow riparian and southern sycamore-alder riparian woodland, and riparian scrub.

Sensitive Plant Species: A total of 22 CNPS List 1B plants, 13 federally and state-listed species, and one federally proposed species occur in the study area in this region. Sensitive plant species include Briand's phacelia *(Phacelia stellaris)*, southern skullcap *(Scutellaria bolanderi* ssp*. Austreomontana),* marsh sandwort *(Arenaria paludicola),* Robinson's pepper-grass *(Lepidium virginicum* var*. robinsonii)* intermediate mariposa lily *(Calochortus weekii* var*. intermedius),* Culter's goldfields *(Lasthenia glabrata* ssp*. Coulteri),* Jaeger's milk-vetch *(Astragalus pachypus* var*. jaegeri),* Orcutt's brodiaea *(Brodiaea orcuttii),* Ramona horkelia *(Horkelia truncata),* San Jacinto Valley crownscale *(Atriplex coronata* var*. notatior),* smooth tarplant *(Centromadia pungens* ssp*. Laevis),* summer holly *(Comorostaphylis diversifolia* ssp*. Diversifolia),* San Diego ambrosia *(ambrosia pumila),* Encinitas baccharis *(Baccharis vanessae),* Nuttall's scrub oak *(Quecus dumosa),* southern tarplant *(Centromadia parryi* ssp*. Australis),* long-spined spineflower *(Chorizanthe polygonoides* var. *longspina),* oil nestraw *(Stylocline citrileum),* San Diego button celery, *(Eryngium aristulatum* var*. parishii),* San Diego goldstar *(Muilla clevelandii),* San Diego mesa mint *(Pogogyne abramsii),* San Diego thorn-mint *(Acanthomintha ilicifolia),* willowy monardella *(Monardalla linoides* ssp*. Viminea),* lakeside ceanothus *(Ceanothus cyaneus),* and Otay mesa mint *(pogogyne nudiuscula)*.

Sensitive Wildlife Species: Fifteen special-status wildlife species have the potential to occur in the study area in this region based on the general types of habitat present as identified in the CNDDB database. These include two special-status fish species, four special-status reptiles and amphibians, six special-status bird species, and three special-status mammal species. Species with potential to occur include Santa Ana sucker *(Catostomus santaanae)*, arroyo chub *(Gila orcutti)*, San Diego horned lizard *(Phrynosoma coronatum blainvillei)*, orange-throated whiptail *(Cnemidophorus hyperythus)*, southwestern arroyo toad *(Cila orcutti*), western spadefoot *(Scaphiopus hammondii)*, least Bell's vireo *(Vireo bellii pusillus)*, California gnatcatcher *(Polioptia californica)*, western yellow-billed cuckoo *(Coccyzus americanus occidentalis)*, western snowy plover *(Charadrius alexandrinus nivosus)*, light-footed clapper rail *(Rallus longirostris levipes)*,

burrowing owl *(Athene cunicularia)*, Stephen's kangaroo rat *(Dipodomys stephensi)*, Los Angeles pocket mouse *(Perognathus longemembris brevinasus)*, and northwestern San Diego pocket mouse *(Perognathus fallax fallax)*.

Wildlife Movement/Migration Corridors: Sensitive natural areas that provide wildlife movement/migration corridors predominantly occur in association with aquatic systems (streams/rivers) in this region. Potential wildlife migratory corridors include Rio Hondo, San Gabriel River, Santa Ana River, Temecula Creek, Murrieta Creek, Box Springs Reserve, San Jacinto River, San Luis Rey River, Lake Hodges/San Dieguito Marsh, Carroll Canyon, Rose Canyon, San Marcos Creek, Escondido Creek, San Clemente Canyon, Rainbow Creek, and San Diego River. These aquatic systems support riparian vegetation that provides food and cover, enhancing the migratory qualities of the habitat.

Important regional wildlife corridors also may be found adjacent to I-215 near Perris, in the vicinity of March ARB, off I-15 near Clinton Keith Road south of the City of Riverside, and in the Los Peñasquitos Canyon Preserve intersected by I-15 near Marine Corps Air Station (MCAS) Miramar. There also are corridors at MCAS Miramar associated with San Clemente Canyon and Rose Canyon and at the Mission Trails Regional Park intersecting I-15 and SR-163.

Water Resources: Many waters of the U.S., including unnamed drainages, traverse the region. A majority of the water bodies, or portions thereof, traversing the LAUS to March ARB proposed segment are channelized. These streams include the Los Angeles River, San Gabriel River, Rio Hondo, San Jose Creek (City of Industry), Etiwanda Channel, and Cucamonga Creek (City of Ontario).

Along the north-south segment (March ARB to Mira Mesa), Perris Valley storm drain (San Jacinto River Channel), San Clemente Canyon, Carroll Canyon, San Diego Aqueduct, San Diego River, Escondido Creek, and Cypress Canyon are channelized and occur in predominantly urbanized areas. Non-channelized water bodies along this alignment include Murrieta Creek, Rainbow Creek, San Luis Rey River, Keys Creek, San Marcos Creek, Lake Hodges/San Dieguito River, Los Peñasquitos Canyon, Rose Canyon, and portions of Carroll Canyon.

Scattered freshwater wetlands associated with the drainage are found along the March ARB to Mira Mesa and Mira Mesa to San Diego segments. These include palustrine wetlands along Murrieta Creek, palustrine emergent marsh, artificially created emergent wetlands associated with San Luis Rey River, and lacustrine and palustrine emergent marshes in association with Lake Hodges and San DeGette Lagoon. Patches of San Diego mesa hardpan vernal pools occur near the proposed Mira Mesa station just north of MCAS Miramar, south of Soledad Freeway, north of San Clemente Canyon, just south of Escondido Freeway, and north of Carroll Canyon.

A number of small lacustrine wetlands, predominately human-made detention ponds that have been naturalized, are scattered along I-10. The most sensitive and biologically productive wetland along the entire study area in this region is the lacustrine/palustrine marsh wetlands associated with the Lake Hodges/San Dieguito River off I-215. There are an estimated 46 ac (19 ha) of estuarine wetlands within the San Diego Airport study area.

Conservation Plans: The San Diego County MSCP is a comprehensive habitat conservation program that addresses multiple species' habitat needs and the preservation of native vegetation communities for a planning area encompassing 900 sq mi (1,448 sq km) in southwestern San Diego County (www.dfg.ca.gov/nccp/mscp). The MSCP is a subregion of the NCCP's coastal sage scrub region. It is one of three subregional habitat conservation efforts in San Diego County that contribute to preservation of regional biodiversity through coordination with other habitat conservation planning efforts throughout southern California. Completed in 1998, the MSCP

targets 171,917 ac (69,573 ha) of open space for conservation within the planning area. This includes 167,667 ac (67,853 ha), or more than half of all remaining natural habitat areas, and 4,250 ac (1,720 ha) of other open spaces (such as disturbed and agricultural lands) that contribute to conservation objectives.

The North San Diego County MSHCP, along the county's northern coast, covers conservation of many natural communities, including vernal pools. In the study area in this region, the following critical habitat units[5] are designated to protect specific species.

- Gnatcatcher: MSHCP units near the campus of the University of California at Riverside in Murrieta and Temecula. The East Los Angeles County Matrix NCCP is located near the City of Industry. In addition, a unit near Escondido, as part of the North County subarea of the MSHCP for unincorporated San Diego County, and an area near Lake Hodges (North San Diego County MSHCP), have been designated.
- Least Bell's vireo: at San Luis Rey River (Unit No. F).
- San Bernardino kangaroo rat: at Etiwanda Alluvial Fan Unit near Fontana, and at Lytle and Cajon Creeks Unit in San Bernardino County.
- Southwestern willow flycatcher: at San Luis Rey River (Unit No. 17), and at San Dieguito River (San Dieguito River Unit).
- Southwestern arroyo toad: at San Luis Rey River (Unit No. 14).

The following are proposed critical habitats in the study area in this region.

- Vernal pools critical habitat (San Jacinto-Hemet Unit No. 33 A) near Perris in Riverside County associated with San Jacinto River and consisting of 5,730 ac (2,319 ha) (50 C.F.R. part 17, vol. 67, No. 185, Tuesday, September 24, 2002).
- Critical habitat (Southwest Riverside Unit) for Quinoa checkerspot butterfly near the I-15 and I 215 junction near Murrieta (50 C.F.R. part 17, vol. 66, No. 26; Tuesday, February 7, 2001).

Los Angeles to San Diego via Orange County

Regional Summary: This region includes the western portion of the Los Angeles basin between downtown Los Angeles and Los Angeles International Airport (LAX) and the coastal areas of southern California between Los Angeles and San Diego, generally following the existing Los Angeles to San Diego via Orange County (LOSSAN) rail corridor. The entire study area in this region lies within the South Coast Bioregion, an area of contrasting landscapes ranging from coastal mountains, canyons, streams and river valleys, rolling hills, and beaches to densely populated cities. The region more specifically lies within the Peninsular Range Physiographic Province. This area is characterized by a Mediterranean climate with winter rainfalls and summer droughts. Average annual rainfall ranges from 9 in (23 cm) in the San Diego region to 15 in (38 cm) in the Los Angeles basin.

In San Diego County, the study area is further characterized by the presence of large coastal wetlands, including six lagoons located in the northern region of the county. These lagoons and the associated open space around them provide vital habitat for resident and migratory birds and other wildlife. Sensitive plant and animal species are found here in substantial numbers despite increasing urbanization, hydrological changes in the watershed, and limited tidal action.

[5] USFWS designates critical habitat maps that show areas or units of habitat considered essential to the protection of threatened and endangered species.

The vegetation communities found in the study area include urban-agricultural and Diegan coastal sage scrub communities. Urban-agricultural vegetation is highly disturbed and widespread within existing residential/commercial, farming, and landscaped areas and may include flower farms, strawberry and vegetable farms, vineyards, and other irrigated uses. Diegan coastal sage scrub is the most commonly found sage scrub community in coastal southern California, ranging from Los Angeles to Baja. This coastal sage scrub community is dominated by low soft-leaved, drought-deciduous shrubs and is typically found on dry sites and steep slopes.

Sensitive Vegetation Communities: Although urban-agricultural vegetation is likely to provide foraging habitat for some wildlife species (e.g., red-tailed hawks, coyotes), it is not considered a sensitive vegetation community. Diegan coastal sage scrub, however, is considered sensitive and provides habitat for many endangered and threatened species. This vegetation community has suffered severe reductions compared to historic levels from spreading urbanization. For the purposes of this program-level analysis, Diegan coastal sage scrub is considered the dominant sensitive vegetation in the study area in this region.

Lagoons and other wetlands are also considered to encompass sensitive vegetation. Sensitive vegetation communities include southern maritime chaparral, succulent sage scrub, southern riparian scrub, southern riparian forest, southern cottonwood willow riparian, Torrey pine forest, southern dune scrub, southern foredunes, southern coastal salt marsh, coastal brackish marsh, and San Diego mesa hardpan vernal pool.

Sensitive Plant Species: The mosaic of vegetation communities that make up Diegan coastal sage scrub and the lagoon/wetlands supports a variety of sensitive plant species. A total of 28 CNPS List 1B plants and nine federally and state-listed species have the potential to occur in the study area. The nine federally and state-listed species include Del Mar manzanita *(Arctostaphylos glandulosa* ssp. *crassifolia),* coastal dunes milk-vetch *(astragalus tener* var. *titi),* Orcutt's spineflower *(Chorizanthe orcuttiana),* San Fernando Valley spineflower *(Chorizanthe parryi* var. *Fernandina),* salt marsh bird's beak, *(Cordylanthus maritimus* ssp. *maritimus),* many-stemmed dudleya *(Dudleya multicaulis),* San Diego button-celery *(Eryngium aristulatum* var. *parishii),* spreading navarretia *(Navarretia fossalis),* California Orcutt grass *(Orcuttia Californica)*.

Sensitive Wildlife Species: Twenty-six special-status species have the potential to occur in the study area in this region, based on the general habitat types present. These include two sensitive invertebrate species, three special-status fish species, six special-status reptiles and amphibians, 11 special-status bird species, and four special-status mammals: San Diego fairy shrimp *(Branchinecta sandiegonensis)*, Riverside fairy shrimp *(Streptocephalus woottoni),* tidewater goby *(Eucyclogobius newberryi),* arroyo chub *(Cila orcutti)*, southern steelhead trout *(oncorhynchus mykiss irideus),* arroyo toad *(Bufo Californicus),* orange-throated whiptail *(Cnemidophorus hyperythrus)*, coastal western whiptail *(Chemidophorus tigris multiscutatus),* northern red-diamond rattlesnake *(Crotalus Exsul),* San Diego horned lizard *(Prynosoma coronatum blainvellei),* western spadefoot *(Scaphiopus hammondii),* southern California rufous-crowned sparrow *(Simophila ruficeps canescens),* coastal cactus wren *(Campylorhynchus brunneicapillus couesi),* western snowy plover *(Charadrius alexandrinus nivosus),* northern harrier *(Circus cyaneus),* California black rail *(Laterallus jamicensis coturniculus),* Belding's savannah sparrow *(Passerculus sandwichensis beldingi),* coastal California gnatcatcher *(Polioptila Californica),* light-footed clapper rail *(Rallus longirostris levipes),* bank swallow *(riparia riparia),* California least tern *Sterna antillarum browni),* least Bell's vireo *(Vireo Bellii pusillus),* northwestern San Diego pocket mouse *(Chaetodipus fallax fallax),* Stephens' kangaroo rat *(dipodomys stephensi),* San Diego desert woodrat *(Neotoma lepida intermedia),* and Pacific pocket mouse *(Perognathus longimembris pacificus).*

The San Diego fairy shrimp, tidewater goby, coastal California gnatcatcher, and least Bell's vireo may potentially be designated critical habitats in the region (and potentially in the corridor/alignment study area) as defined by USFWS.

Wildlife Movement/Migration Corridors: Only large open areas, lagoons and surrounding park or reserve areas, and riparian areas in undeveloped areas are considered potential wildlife movement corridors in this region. These include San Juan Creek; Camp Pendleton Marine Corps Base (including San Mateo Creek, San Onofre Creek, and Santa Margarita River); San Luis Rey River; Buena Vista Lagoon; Aqua Hedionda Lagoon; Batiquitos Lagoon; San Elijo Lagoon; San Dieguito River and Lagoon; Los Peñasquitos Lagoon; Peñasquitos Creek and Canyon; Sorrento Valley, Rose Canyon; and San Clemente Canyon.

Water Resources: The estuarine lagoons of northern San Diego County are within the coastal zone. They are a unique biological resource and are the focus of many resource agencies and other entities interested in the quality of these areas. Six lagoons are located in the in the region: Buena Vista, Agua Hedionda, Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos.

Vernal pool, a potential component of coastal sage scrub or chaparral landscapes, is considered another type of wetland. Vernal pools are likely to exist within the study area in this region, particularly on the Camp Pendleton Marine Corps Base. There are potentially more than 25 major non-wetland waters in the region.

Conservation Plans: Other than the potential USFWS-designated critical habitats described in the sensitive plants discussion above, there are no conservation plans identified in this region. The Batiquitos Lagoon at the southern edge of Carlsbad is 600 ac (243 ha) and was made a CDFG-designated State Ecological Reserve in 1983. The San Elijo Lagoon located between Encinitas and Solana Beach is a CDFG-designated State Ecological Reserve. A portion of the San Dieguito Lagoon at the northern edge of the City of Del Mar is also a CDFG-designated State Ecological Reserve, as is the recently designated Los Peñasquitos Lagoon State Preserve.

3.15.3 Environmental Consequences

A. EXISTING CONDITIONS COMPARED TO NO PROJECT ALTERNATIVE

The biological resources and wetlands described above in the affected environment section (Section 3.15.2) characterize the existing conditions in the five regions potentially affected by the alternatives, drawing primarily from existing available data, with gaps in data in some areas. Because this is a program-level analysis, data are representative rather than complete, and are for comparison purposes.

Though some changes may occur between the existing conditions and the year 2020 due to natural changes in resources as well as urbanization and transportation projects that would be implemented by 2020 under the No Project Alternative, attempting to estimate the extent of these changes would be speculative at this time. Further, it is assumed that each of the projects associated with the No Project Alternative would incorporate and implement the appropriate mitigation and monitoring measures to minimize or avoid considerable impacts on sensitive biological and wetland resources. It is also realistic to project that urbanization in some of the regions resulting from population growth over the next 17 years (to 2020) would change the conditions reported in this document, and that continued efforts by local communities and nonprofit organizations (e.g., The Nature Conservancy) would continue to expand protected areas (habitat conservation planning areas). Because estimating the extent of change prior to 2020 would be speculative, no substantial change to the existing conditions is assumed for purposes of this program-level evaluation and comparison of alternatives.

B. NO PROJECT ALTERNATIVE COMPARED TO MODAL AND HIGH-SPEED TRAIN ALTERNATIVES

The existing conditions associated with the No Project Alternative are used as a baseline for comparison with the changes or impacts that would potentially result from either the Modal or HST Alternatives. Though potential impacts would vary from segment to segment along the Modal and HST Alternatives, overall, based on available information for each of the study areas along corridors and alignments, the Modal Alternative would potentially affect a greater area or number of sensitive biological and wetland resources than HST alignment options. Because of the higher potential for impacts under the Modal Alternative, associated mitigation measures are expected to be more extensive and thus more expensive than under the HST Alternative.

This section provides a general comparison of resources potentially impacted by the Modal and HST Alternatives. The following section compares the potential impacts of the alternatives by region.

Modal and HST Alternatives

Because there are several alignment and station options for the HST Alternative, a range of potential impacts was developed that represents the options with the fewest to the greatest potential impacts on biological and wetland resources within a region for purposes of a broad, program-level review.

Using existing data and information as the basis for the evaluation, approximately 77,018 ac (31,168 ha) of sensitive vegetation are present in the study area for the Modal Alternative, which is substantially more than the approximately 9,773 ac (3,955 ha) to 17,619 ac (7,130 ha) present in the study area for the HST Alternative. Approximately 5.3 million ft (1.6 million m) of non-wetland waters are present in the Modal Alternative study area, which is substantially more than the up to 1.2 million ft (0.4 million m) present in the HST Alternative study area. Approximately 23,172 ac (9,377 ha) of wetlands are potentially present in the Modal Alternative study area compared to approximately 3,996 ac (1,617 ha) to 18,356 ac (7,428 ha) for the HST Alternative. There were 321 special-status species identified as potentially present in the study area for the Modal Alternative, compared to a range of 279 to 350 for the HST Alternative. Table 3.15-1 summarizes the potential direct and indirect impacts on biological resources and wetlands from disturbance to or fragmentation of habitat due to construction and operation of the Modal and HST Alternatives.

Modal Alternative

The highway improvements under the Modal Alternative focus entirely on existing corridors and facilities and would comprise more miles of alignment (linear improvement) statewide than the HST Alternative. The potential expansion of lanes on existing highways would require extensive cut-and-fill through mountain passes to accommodate the lanes and associated interchange widening. One example is the potential highway widening of the existing I-5 through the Grapevine where extensive cut and fill would be necessary in steep mountain terrain. Federally and state-listed plant and animal species in the Grapevine area along I-5 between SR-99 and SR-14 that could potentially be affected by lane expansions include slender-horned spineflower, San Fernando Valley spineflower, Santa Ana sucker, Arroyo toad, San Joaquin kit fox, Tehachapi slender salamander, unarmored threespine stickleback, and San Joaquin antelope squirrel. Vegetation communities in the Grapevine segment that would be subject to potential impacts from widening I-5 include California walnut woodland, Riversidean alluvial fan sage, southern cottonwood willow riparian forest, southern willow scrub, valley needlegrass grassland, and valley oak woodland.

Table 3.15-1
Summary of Potential Impacts on Biological Resources for Modal and HST Alternatives

Region	Sensitive Vegetation in Acres (Hectares)	Wildlife Movement Corridor (Yes/No)	Non-wetland Jurisdictional Waters in Linear Feet (Meters)	Wetlands in Acres (Hectares)	Marine/Anadromous Fish Resources (Yes/No)	Number of Special-Status Species
Modal Alternative						
Bay Area to Merced	1,323 (535)	Y	4,630,791 (1,411,465)	6,384 (2,583)	Y	80 (72,246 ac [29,237 ha])
Sacramento to Bakersfield	52,535 (21,260)	Y	59,329 (18,083)	10,158 (4,111)	Y	50
Bakersfield to Los Angeles	2,773 (1,122)	N	172,656 (52,625)	547 (221)	Y	23
Los Angeles to San Diego via Inland Empire	14,321 (5,795)	Y	401,531 (122,387)	859 (348)	N	65
Los Angeles to San Diego via Orange County	6,066 (2,455)	N	119,525 (36,431)	5,224 (2,114)	N	103
Total Modal Alternative	**77,018 (31,168)**	**Y**	**5,383,832 (1,640,992)**	**23,172 (9,377)**	**Y**	**321**
High-Speed Train Alternative						
Bay Area to Merced	455–812 (184–329)	Y	322,390–650,073 (98,264–198,142)	576–10,721 (233–4,339)	Y	24–38 (13,705–18,613 ac [5,546–7,532 ha])
Sacramento to Bakersfield	1,227–4,696 (496–1,900)	Potential	26,455–70,720 (8,063–21,555)	1,601–5,540 (648–2,242)	Y	22–40
Bakersfield to Los Angeles	482–1,616 (195–654)	Y	101,904–146,784 (31,060–44,740)	231–400 (93–162)	Y	14–23
Los Angeles to San Diego via Inland Empire	7,609–10,301 (3,079–4,169)	Y	273,699–353,837 (83,423–107,849)	701–751 (284–304)	N	53–77
Los Angeles to San Diego via Orange County (HST corridor)	0	N	9,880–23,760 (3,011–7,242)	1–2 (0.4–0.8)	N	14–17
Los Angeles to San Diego via Orange County (conventional rail corridor)	0–194 (0–78)	Y	75,350–92,067 (22,967–28,062)	886–942 (358–381)	Y	152–155
Total HST Alternative	**9,773–17,619 (3,955–7,130)**	**Y**	**783,223–1,266,521 (238,726–386,036)**	**3,996–18,356 (1,617–7,428)**	**Y**	**279–350**

Additional right-of-way necessary under the Modal Alternative would potentially include some areas of currently undeveloped natural vegetation. For example, right-of-way needed for potential widening of SR-152 near Gilroy passes through the natural area of Pacheco Pass in the Diablo Range. Also, bridges and overpasses would be widened in urban, suburban, coastal, and open space environments, increasing the footprint of the highway and potential shadow effects[6] beneath the infrastructure. Bridge widening would be of concern in areas where the existing bridge columns and approaches impede tidal flow, such as the lagoon areas of northern San Diego County.

High-Speed Train Alternative

The proposed HST Alternative would generally be located in or adjacent to existing transportation rights-of-way such as highways or railroads, or would be in tunnels or elevated through mountain passes and sensitive habitat areas. The HST Alternative would include several tunnels, which could avoid or substantially reduce surface impacts on sensitive biological resources except at tunnel portal areas. The footprint of bridges across bodies of water such as lagoons in San Diego would not be increased under the proposed HST Alternative because new bridges would replace older bridges, and the new bridges would use materials and designs to minimize the number of piles/columns in the water and would retain the same or smaller footprint of the span. The east-west HST options across the Diablo Range and across the western portion of the San Joaquin Valley would potentially impact wildlife movement/migration corridors for the San Joaquin kit fox.

3.15.4 COMPARISON OF ALTERNATIVES BY REGION

The potential impacts on biological resources and wetland/water resources that could result from the Modal and HST Alternatives through each of the regions are summarized above in Table 3.15-1. To allow a reasonable means of comparing the impacts of the alternatives and to estimate a range of potential areas of impact on biological resources for each region, the various options for the HST Alternative were considered combined for each region. For a summary of the potential impacts on biological resources for all alignment and station options for each region see Appendix 3.15-D.

As discussed earlier, all comparisons are based on information currently available from existing databases. Field surveys, which would be performed during a subsequent environmental review, would provide more detailed information and could indicate an increase or a decrease in the potential impacts on biological resources from a proposed HST system, particularly along routes that have not previously been the focus of field surveys or mapping by any of the regulatory agencies (such as CDFG or USFWS).

A. BAY AREA TO MERCED

Figures 3.15-1 and 3.15-2 show the general locations of sensitive habitat and wetlands in the Bay Area to Merced region. The Modal and HST Alternatives would have the potential to result in potential adverse impacts on the following resources.

- Several special-status species, including the California red-legged frog and San Joaquin kit fox.
- Sensitive plant communities and sensitive habitat, including marsh, chenopod (alkali) scrub, valley sink scrub, riparian woodlands (e.g., sycamore alluvial woodland), and valley oak woodland plant communities.
- Sensitive habitat of concern, such as freshwater emergent wetland.
- San Joaquin kit fox foraging habitat.

[6] *Shadow effect* refers to shading of plants that would affect access to sunlight and health of the plants.

- Oak trees.
- Streams below top-of-bank, including riparian corridors.
- Anadromous fish habitat.
- Wetlands and waters at a level that may require an Individual Permit and Section 404(b)(1) Analysis of Alternatives, which would be addressed in a subsequent environmental review.

Modal Alternative

The Modal Alternative could result in potential impacts on several hundred sensitive plant communities, including possibly more than 74,000 ac (29,947 ha) of habitat for 80 special-status species in the study area in this region. The Modal Alternative could also impact more than 2 million linear ft (0.6 million linear m) of streams, more than 660 ac (267 ha) of other water bodies, and more than 6,300 ac (2,550 ha) of NWI wetlands. This would constitute a potentially high impact.

The Modal Alternative potentially would impact hydric soils (indicator of wetlands), serpentine soils (substrate for several special-status species), and oak trees. Expanding SR-152 by two lanes between Gilroy and Hollister would potentially impact sensitive habitat in the study area for the red-legged frog, and the San Joaquin kit fox in the Diablo Range, as well as other special-status species, because it would require extensive cut-and-fill work in some areas to accommodate lane additions. The Modal Alternative would include extending existing infrastructure (bridges, culverts, abutments, and fill) to accommodate additional lanes, and would be expected to include mitigation for potential wildlife and biological impacts. However, providing sufficient mitigation for compliance with CWA requirements for wetlands and waters would likely be difficult and challenging. For example, along the I-880 corridor between Oakland and San Jose, almost all onsite wetland mitigation sites have been taken for previous freeway widening projects. Mitigation along the I-880 corridor would need to be undertaken elsewhere offsite.

High-Speed Train Alternative

The HST Alternative in the Bay Area to Merced region would potentially result in impacts similar to those associated with the Modal Alternative along the west-east segments across the Diablo Range where potential impacts on threatened and endangered species, including the San Joaquin kit fox, are possible. The kit fox has a wide distribution, using the spine of the Diablo Range as a north-south movement corridor. The California red-legged frog occupies corresponding valley wetlands and riparian corridors. Efforts to conserve the California tiger salamander are increasing, and USFWS has proposed listing it as a threatened and endangered species.

The proposed HST Alternative alignment options would create new transportation corridors in this region that would have the potential to fragment habitat for threatened and endangered species in the Diablo Range. However, the HST Alternative would potentially affect fewer special-status species than the Modal Alternative (24 to 38 species for the proposed HST Alternative compared to 80 species for the Modal Alternative) because of proposed tunneling in a sensitive part of the region (Diablo Range and Henry Coe State Park).

The proposed HST Alternative alignment options would have the potential to affect wildlife movement/migration corridors in this region, primarily for terrestrial mammals, depending on the selection of a final alignment. Because the proposed routes between both San Francisco and Gilroy and Oakland and Gilroy are along existing rail corridors, little impact on movement/migration routes would be anticipated. The potential for impacts would be expected to occur mainly along the east-west HST options through the Diablo Range (Diablo Range direct) and across the western portion of the San Joaquin Valley. Portions of these alignments are

proposed to be in tunnels (between 11 mi [18 km] and 16 mi [26 km], depending on alignment option) and the segments in tunnels would not hinder wildlife movement. Segments that would be placed at grade (cut and fill) would require fencing the HST alignment for the safety of humans, as well as protection from train-wildlife collisions, and would have the potential to interfere with wildlife movement. Placement of overpasses, underpasses, and tunnels along these alignments could provide for movement of wide-ranging and migratory species. The proposed HST Alternative would potentially impact a relatively small percentage of wetlands compared to the Modal Alternative (from approximately 2.8% for the Bay Area to Merced segment with the Oakland to San Jose East plus tunnel under Henry Coe State Park, to about 6.7% for the Hayward/Niles/Mulford alignment plus the south line Gilroy station option). The major wetland features in this region include the San Francisco Bay. With the exception of the Mulford Line, the HST alignment options would be able to avoid or limit potential impacts on these features (see Figure 3.15-2). The Modal Alternative would potentially affect 6,384 ac (2,584 ha) total acres of wetlands in the region, compared to potential impacts on between 576 ac (233 ha) and 10,721 ac (4,339 ha) for the HST Alternative, depending on the alignment options.

High-Speed Train Alignment Option Comparisons

The Hayward/Niles/Mulford alignment option would pass through the Don Edwards San Francisco Bay National Wildlife Refuge adjacent to the existing rail line, potentially impacting substantially more wetlands (1,357 ac [549 ha]) than the Hayward alignment/I-880 (464 ac [188 ha]). The Mulford Line option would potentially affect more special-status species habitat (25,742 ac [10,417 ha]) than the Hayward alignment/I-880 (21,974 ac [8,893 ha]), potentially impacting habitat for special-status shorebirds and waterfowl, including the endangered California clapper rail. In addition, the Mulford alignment option would pass through important wetlands and tidal salt marsh that supports endangered species such as the salt marsh harvest mouse, steelhead, western snowy plover, and red-legged frog.

The southern route across the Pacheco Pass, which follows SR-152, would impact approximately 100,000 more linear ft (30,480 m) of jurisdictional waters than the northern tunnel option (Diablo Range direct). The HST segment using the northern tunnel under Henry Coe option would involve the fewest wetland impacts. The Diablo Range direct alignments would potentially affect approximately 3,000 ac (1,214 ha) fewer of special-status habitat; however the difference in special-status species occurrence between the crossing options of the Diablo Range is less than 10%. Of the three Diablo Range direct options, the northern tunnel alignment would potentially affect fewer special-status species than other alignment options. The Diablo range direct options would also have potential impacts on aquatic resources of national importance (ANSI) along the Orestimba Creek.

B. SACRAMENTO TO BAKERSFIELD

The No Project, Modal, and HST Alternatives would all cross sensitive areas of biological resources, including habitats of endangered species, at the southern end of the San Joaquin Valley. The available GIS data indicate the presence of certain types of habitat, and therefore the possible presence of special-status species based on available information. Location-specific data would be needed to make more precise determinations.

Figures 3.15-3a, 3.15-3b, 3.15-4a, and 3.15-4b show the general locations of habitat and wetlands in the Sacramento to Bakersfield region. As illustrated in these figures, possible improvements to multiple highway facilities (SR-99 and I-5) are included as part of the Modal Alternative, whereas a single general alignment option with some variations is proposed for this region as part of the HST Alternative.

Modal Alternative

From an analysis of maps and GIS data, the Modal Alternative would potentially result in impacts on up to 80 special-status species compared to potential impacts on between 22 and 40 species for the HST Alternative. This is largely due to assumed improvements along I-5 within the foothills of the Coastal Range.

The Modal Alternative would result in potential impacts on about 52,535 ac (21,260 ha) of sensitive vegetation communities, with a large number of impacts between Sacramento and Stockton. The Modal Alternative would potentially impact more than 10,000 ac (4,047 ha) of wetlands in the region. Potential impacts on other waters would vary across the region, ranging from low to high impacts (59,329 ac [24,010 ha]), with the highest number of acres potentially impacted (5,500 ac [2.226 ha]) in the Sacramento to Stockton part of the region.

The Modal Alternative would result in potential impacts on fish resources between Sacramento and Fresno during construction because of the need to cross streams and rivers. From Sacramento to Stockton and Merced to Fresno, the Modal Alternative would potentially result in a high incidence of impacts on threatened and endangered species (more than 2,500 ac [1,012 ha] of blue oak woodland). Potential impacts may result to San Joaquin kit fox habitat between Tulare and Bakersfield. In this region the Modal Alternative would have the potential to result in a high incidence of impacts on wildlife habitats and of disturbance to wildlife movement corridors.

High-Speed Train Alternative

The HST Alternative would pass largely through agricultural lands in this region and would affect few areas of threatened and endangered species, except in the southern portion of the region from Fresno to Bakersfield (San Joaquin kit fox). Similar to the Modal Alternative, the proposed HST Alternative would result in potential impacts on fish resources during construction between Sacramento and Fresno because of the number of streams and rivers the alignment options would cross.

High-Speed Train Alignment Option Comparisons

Within the HST alignment segment from Sacramento to Stockton, the data show the possibility of considerably more potential disturbances to biological resources along the Union Pacific Railroad (UPRR) than along the Central California Traction Company (CCT) route. Because of its proximity to the confluence of the Sacramento and American Rivers, the downtown Sacramento Valley station site may have impacts on biological resources. From Stockton to Modesto, the incidence of potential impacts on biological resources would not differ significantly for the two HST options, except that the UPRR/Modesto Downtown station option would potentially impact about twice as much wetland acreage as the BNSF/Modesto Briggsmore option. However, fewer potential impacts on wetlands would be expected under the proposed HST Alternative than the Modal Alternative.

The potential for impacts on sensitive plant and animal species for the various HST alignment options between Modesto and Merced would be low. Each of the alignments would potentially result in similar impacts on wetlands, except the BNSF/Merced Municipal Airport station option would cross substantially more acres of wetlands than the other option. The Merced Downtown station option would have a low potential for impacts on wetlands, while the potential for impacts at the airport site would be high. With respect to non-wetland waters, the UPRR alignment site would have the fewest potential impacts.

From Merced to Fresno, the UPRR option would encounter fewer wetlands and sensitive habitats than the BNSF option. From Fresno to Tulare, the BNSF option with a high-speed loop around Fresno would have the potential to result in impacts on the highest number of threatened and

endangered species; the HST loop west of Fresno would generally increase the number of potential impacts on biological resources over the route through Fresno. The BNSF/Hanford station option would potentially have fewer impacts on biological resources than the UPRR/Visalia Airport station option due to the greater presence of wildlife habitats, wetlands, and waters along the UPRR.

From Tulare to Bakersfield, fewer potential overall impacts on biological resources would be expected for alignments parallel to UPRR north of Bakersfield than for the BNSF alignments. There would not be substantial differences in potential impacts expected among the various Bakersfield station options.

C. BAKERSFIELD TO LOS ANGELES

Figures 3.15-5 and 3.15-6 show the general locations of sensitive habitat and wetlands in the Bakersfield to Los Angeles region in relationship to Modal Alternative corridors and alignments for the HST Alternative.

The Modal Alternative has the potential for higher impacts on sensitive vegetation than the HST Alternative: 2,773 ac (1,122 ha) for the Modal Alternative compared to between 482 ac (195 ha) and 1,616 ac (654 ha) for the HST Alternative. The Modal Alternative also has the potential to result in impacts on habitats that may contain a greater number of wildlife species (23 species compared to between 14 and 23 for the HST Alternative). In addition, the Modal Alternative has the potential to result in impacts on more acres of waters and wetlands than the HST Alternative: 547 ac (221 ha) of wetlands for the Modal Alternative compared to between 231 ac (93 ha) and 400 ac (162 ha) for the HST Alternative.

The Modal and HST Alternatives would potentially impact a similar number of wildlife movement/migration corridors in this area. Based on a general assessment of the potential magnitude of the possible impacts, while taking into consideration the relative sensitivity of the resources potentially affected and expected mitigation requirements, the Modal Alternative would have the potential to impact a greater number of sensitive biological resources than the HST Alternative. However, because the HST Alternative would traverse more undeveloped (and possibly more unsurveyed) areas than the Modal Alternative, once the project-level analysis is completed and field surveys of resources are performed, it is possible that the HST Alternative could impact a larger number of special-status species and habitat than has been estimated in this document. The potential to use tunneling and elevated structures and special construction techniques to reduce or avoid impacts of the HST Alternative would be included in the design for the project, should a decision be made to proceed to the next phase of analysis.

Modal Alternative

Implementation of the Modal Alternative would potentially result in impacts on about 2,775 ac (1,123 ha) of eight sensitive vegetation communities, 19 sensitive species, five wildlife movement/migration corridors, 33 mi (172,656 ac [69,872 ha]) of non-wetlands waters, 547 ac (221 ha) of jurisdictional wetlands, and marine/anadromous fish resources at the Santa Clara River. Most of these impacts would result from the widening of I-5 from SR-99 to SR-14, and of SR-14 from Palmdale to I-5. Extensive cut and fill would be required for the Modal Alternative along I-5 in the Grapevine mountain crossing where biological and wetland resources are shown in existing data sources.

It is expected that the Modal Alternative would result in potential impacts on sensitive biological resources primarily as direct and indirect impacts during construction. Operational impacts are expected to be minor in comparison to construction impacts and would likely consist of indirect

impacts such as dust; the introduction and spread of nonnative, invasive plants; stormwater runoff; siltation; and erosion.

High-Speed Train Alternative

Implementation of the proposed HST Alternative would potentially result in impacts on eight sensitive vegetation communities (between 482 ac [195 ha] and 1,616 ac [654 ha]), 14 to 23 sensitive species, five wildlife movement/migration corridors, 28 mi (between 101,904 ac [41,239 ha] and 146,784 ac [59,402 ha]) of non-wetland waters, between 231 ac (93 ha) and 400 ac (162 ha) of wetlands, and marine/anadromous fish resources at the Santa Clara River. Most of these impacts would occur in the I-5 and SR-58/Soledad Canyon corridors. The Metrolink/UPRR and combined I-5/UPRR options would not impact any sensitive biological resources.

High-Speed Train Alignment Option Comparisons

The Bakersfield to Sylmar segment of the HST includes two routing options: 1) the I-5/Grapevine route (either the Union Avenue or Wheeler Ridge corridor and the I-5 Tehachapi corridor); and 2) the SR-58/Soledad Canyon route (the SR-58 corridor, Antelope Valley corridor, Palmdale station site, and Soledad Canyon corridor). The I-5 route would have the potential to impact slightly more sensitive plant communities, wetlands, and non-wetland waters than the SR-58/Soledad Canyon route. The SR-58/Soledad Canyon route would potentially impact more sensitive plant and wildlife species and more wildlife movement/migration corridors than the I-5 route. Overall, however, there would be a slightly greater potential for impacts on biological resources for the SR-58/Soledad Canyon route than for the I-5 route.

The sensitive plant and wildlife species that would potentially be impacted by the SR-58/Soledad Canyon route are expected to be greater than those for the species that would be impacted by the I-5 route. In addition, a greater proportion of the I-5 route would be in tunnels or on an elevated structure, which would reduce potential impacts on sensitive biological resources. Tunneling and elevated structure construction types could avoid potential impacts on wildlife movement/migration corridors along the I-5 route. In contrast, there would be very limited sections of tunnel and elevated structure along the SR-58/Soledad Canyon route, particularly where this route parallels the Santa Clara River. Potential impacts on sensitive plants and wildlife, as well as on major wildlife movement/migration corridors, would therefore be expected to be greater due to the use of cut-and-fill construction techniques. Additional tunneling in Soledad Canyon would reduce potential impacts on sensitive biological resources.

The Sylmar to Los Angeles segment of the HST includes two routing options: 1) the combined I-5/UPRR route; and 2) the Metrolink/UPRR route. There are also a number of options on the approach to LAUS.

The I-5 route would have the potential to impact slightly more biological resources than the Metrolink/UPRR route. The I-5 route could potentially impact one sensitive plant community, whereas the Metrolink/UPRR route would not impact any. The I-5 route would also potentially encounter more water resources than the Metrolink/UPRR route.

The LAUS approach options would potentially impact non-wetland waters. The LAUS east bank north/LAUS east bank siding option could potentially impact more waters than the LAUS south siding or the LAUS existing siding option. The LAUS existing south/south connection could potentially impact more waters than the LAUS existing east/east connection.

D. LOS ANGELES TO SAN DIEGO VIA INLAND EMPIRE

Both the Modal and HST Alternatives potentially would impact biological resources in the study area in this region. However, when considering biological resources across the region, there are not

significant differences among the alternatives and alignment options. Potential advantages in one resource area may be accompanied by potentially higher impacts in other resource areas.

In this region, the Modal Alternative would potentially impact approximately 14,321 ac (5,796 ha) of sensitive vegetation compared to between 7,609 ac (3,079 ha) and 10,301 ac (4,169 ha) for the HST alternative, and an estimated 859 ac (348 ha) of wetlands compared to between 701 ac (284 ha) and 751 ac (304 ha) for the HST. For special-status species, the Modal Alternative would potentially affect 65 species, and the HST Alternative would potentially affect between 53 and 77 species. Figures 3.15-7 and 3.15-8 show the general locations of habitat and wetlands in the Los Angeles to San Diego region.

Potential wetland impacts for the HST Alternative include impacts on vernal pools along the alignment from Mira Mesa to San Diego, and impacts on the San Dieguito wetlands. The HST Alternative would also result in potential impacts on a number of federally listed wildlife species. The Los Peñasquitos Canyon Preserve near MCAS Miramar provides a significant regional wildlife corridor that could be impacted by the HST Alternative.

In the Los Angeles to March ARB segment, the Modal and HST Alternatives would potentially result in similar levels of potential impacts on biological resources. Both alternatives would result in potential impacts on wildlife habitat and wildlife movement corridors, and both alternatives would be expected to encounter threatened and endangered species as well as sensitive vegetation and non-wetland waters. Because of the more urbanized character of the I-10 corridor compared to the UPRR/Colton or UPRR/Riverside rail corridors, the Modal Alternative would result in slightly fewer potential impacts than the HST Alternative alignments in this segment. However, the potential Modal Alternative impacts along the I-15 freeway corridor would be avoided by the HST Alternative because it would follow the San Jacinto Line (near the I-215 freeway corridor).

In the March ARB to Mira Mesa segment, the Modal and HST Alternatives would result in a similar level of potential impacts on biological resources. Both alternatives would result in potential impacts on wildlife habitat and movement corridors and encounter threatened and endangered species. Both alternatives would encounter similar amounts of sensitive vegetation and potentially would result in impacts on non-wetland waters along the I-215 corridor between March ARB and the I-15/I-215 split at Temecula. Both alternatives would have the same potential impacts along the I-15 corridor between the I-15/I-215 split and Mira Mesa. However, the HST Alternative would avoid the potential Modal Alternative impacts along the I-15 corridor north of the I-15/I-215 split at Temecula because the HST alignment would follow the I-215 corridor north of the split rather than the I-15 corridor in this segment.

In the Mira Mesa to San Diego segment, the Modal and HST Alternatives would result in a similar level of potential impacts on biological resources. Both alternatives would potentially result in impacts on wildlife habitat and movement corridors and would potentially encounter threatened and endangered species. The Modal Alternative and the three HST alignment options that follow the I-15 to Qualcomm Stadium would be expected to encounter similar amounts of sensitive vegetation and would potentially result in impacts on non-wetland waters along the I-15 corridor between Mira Mesa and I-8. Although the other two HST alignment options would depart from the I-15 corridor, they still potentially would encounter sensitive biological resources, passing through undeveloped areas to the coast and then south along the existing rail corridor to downtown San Diego. The HST Alternative would avoid the potential Modal Alternative impacts along the SR-163 freeway corridor.

Modal Alternative

The Modal Alternative would have the potential to result in impacts on more than 14,300 ac (5,787 ha) of sensitive vegetation communities; 65 sensitive species; more than 401,500 linear ft (122,377 m) of non-wetland waters; and 859 ac (348 ha) of wetlands, including 45 ac (18 ha) of

San Diego Bay estuarine wetlands at San Diego International Airport. The I-15 improvements included in the Modal Alternatives could result in substantial impacts on sensitive vegetation communities (7,273 ac [2,943 ha]) and wetlands (531 ac [215 ha]), including 36 ac (15 ha) of vernal pools, just north of MCAS Miramar. These wetlands are known to support the California least tern and western snowy plover, both of which are federally listed as endangered.

High-Speed Train Alternative

The HST Alternative would have the potential to impact the following ranges of biological resources, depending on the alignment option.

- Sensitive vegetation: between 7,609 ac (3,079 ha) and 10,301 ac (4,169 ha).
- Non-wetlands waters: between 273,699 linear ft (83,423 m) and 353,837 linear ft (107,850 m).
- Wetlands: between 701 ac (284 ha) and 751 ac (304 ha).
- Sensitive species (based on habitat types present): between 53 and 77.

High-Speed Train Alignment Option Comparisons

Although some differences have been identified among the HST alignment options, these differences do not clearly indicate that one alignment option compared to the others would potentially result in substantially fewer impacts on biological resources in this region. For example, alignment options that include the San Bernardino loop would result in slightly fewer potential impacts on wetlands and other waters for either of the two mainline HST alignments (UPRR/Colton or UPRR Riverside/UPRR Colton) compared to those not including the loop. The proposed tunneling associated with the Escondido Transit Center alignment option would result in slightly less orchard and vineyard habitat acreage being impacted and fewer potential impacts on water resources compared to the option that adheres to the I-15 corridor. The alignment option serving the Qualcomm Stadium station would result in a slightly higher level of potential impacts on sensitive vegetation, but otherwise would result in potential impacts similar to those for the two alignment options that join the coast and serve the airport and downtown San Diego. Overall, these differences would not readily distinguish the HST alignment options in terms of potential impacts on biological resources.

In the Los Angeles to March ARB segment, the three alignment options would have fairly similar potential impacts on sensitive biological resources. However, there are characteristics that would distinguish these alignments. The UPRR Riverside alignment option would encounter substantially more grassland and potentially impact slightly more water resources than the two UPRR Colton alignment options. The San Bernardino loop option (an option to both the UPRR Colton and UPRR Riverside alignments) would reduce the amount of potentially impacted waters and wetlands.

The University of California, Riverside station potentially would encounter wildlife habitat, threatened and endangered species, and a substantial amount of non-wetland waters. The Colton station site potentially would result in impacts on both categories of protected species and non-wetland waters. The El Monte station site potentially would result in impacts on species of special concern. The South El Monte station potentially would impact non-wetland waters. Otherwise, the stations in this segment would not be expected to encounter sensitive biological resources.

In the March ARB to Mira Mesa segment, the two alignment options would result in virtually identical potential impacts, except for a slight difference in the amount of orchards and vineyard habitat potentially affected, and a slightly lower acreage of non-wetland waters potentially

impacted by the alignment option that would serve the Escondido Transit Center station. The difference is because this alignment option would depart the I-15 freeway corridor and pass through the more urbanized central portion of Escondido to serve the Escondido Transit Center station. This diversion would avoid a portion of the sensitive biological resources that would be potentially be affected by the other alignment option.

The March ARB station site potentially would impact threatened and endangered species as well as coastal sage scrub. The Escondido station potentially would impact species of special concern. The Murrieta at I-15/I-215 station potentially would impact a substantial amount of non-wetland waters. Otherwise, the stations in this segment would not be expected to encounter sensitive biological resources.

In the Mira Mesa to San Diego segment, the three alignment options would be expected to result in potential impacts on wildlife habitat and movement corridors and to encounter threatened and endangered species. The types of predominant vegetation and the wetlands potentially encountered would distinguish the three options.

Along the Miramar Road HST alignment option there is a predominance of mixed chaparral and southern riparian scrub, and this option would potentially encounter a substantial amount of non-wetland waters. Estuarine areas along the coast would be the majority of the potentially affected wetlands with some vernal pool wetlands in the interior portion of the segment.

Along the Carroll Canyon HST alignment option there is a predominance of southern riparian scrub, and this option would potentially encounter more non-wetland waters (as a result of the canyon alignment) compared to the other two alignment options. Potential wetlands impacts would be primarily estuarine along the coast, with a greater amount of vernal pool wetlands compared to the Miramar Road alignment.

Along the Qualcomm Stadium HST alignment option there is a predominance of mixed chaparral, and this option would potentially encounter a substantial amount of non-wetland waters (similar in quantity to the Miramar Road alignment). These would be mostly palustrine and vernal pool wetlands, with a similar quantity of vernal pool wetlands compared to the Carroll Canyon alignment option.

The Transit Center station site in San Diego would not be expected to result in potential impacts on protected species or wetlands, but it would potentially result in impacts on habitat and movement corridors, as well as potentially encounter southern riparian scrub and non-wetland waters. Potential impacts from the Mira Mesa station would be limited to palustrine and vernal pool wetlands. Three of the station sites—Qualcomm Stadium, San Diego International Airport, and San Diego station at Santa Fe Depot—would potentially result in impacts on threatened and endangered species. Two of the station sites (Qualcomm Stadium and San Diego International Airport) potentially would impact wildlife habitat. In addition to potential species impacts, the San Diego station at Santa Fe Depot would potentially impact estuarine wetlands not found in the other stations in this segment.

E. LOS ANGELES TO SAN DIEGO VIA ORANGE COUNTY

There are many alignment and construction options for this portion of the proposed HST Alternative. To allow a reasonable comparison of impacts among the No Project, Modal, and HST Alternatives, the conventional rail improvement options are summarized with a range of potential impacts. This range is represented by two of many possible route combinations between LAUS and San Diego: 1) a higher-level infrastructure route, and 2) a lower-level infrastructure route.

Though potential impacts would vary from segment to segment in this region along the Modal and HST Alternatives, many segments of the Modal Alternative appear to have a higher potential for affecting sensitive biological resources and water resources compared to the HST Alternatives. The proposed rail improvements, both high speed and conventional, are expected to adversely affect fewer sensitive biological resources and waters, because most improvements would be made within an existing rail corridor in which any biological resources present would already have been disturbed, or would involve proposed tunneling options that would reduce surface impacts. Figures 3.15-9 and 3.15-10 show the general locations of habitat and wetlands in the Los Angeles to San Diego region.

Modal Alternative

As defined, the Modal Alternative would require the acquisition of approximately 1,100 ac (445 ha) of adjacent right-of-way between Los Angeles and San Diego, of which 370 ac (150 ha) would be paved to accommodate the highway and interchange widening proposed under this alternative.[7] The additional right-of-way would include approximately 6,066 ac (2,455 ha) of natural vegetation that are found in undeveloped or unimproved open-space areas**.** Bridges and overpasses would be widened in urban, suburban, coastal, and open-space environments, increasing the footprint of the highway as well as shadow effects beneath the infrastructure. Bridge widening would likely be of most concern in the lagoon areas of northern San Diego County, where the existing bridges impede tidal flow. This impact could be exacerbated if the footprint of the highway bridge were enlarged within the lagoons. The increased pavement across surface waters would increase the amount of urban runoff and could increase the pollutant burden in local rivers, creeks, and lagoons. An estimated 5,224 ac (2,114 ha) of wetlands would potentially be affected by the Modal Alternative, and an estimated 103 special-status species would potentially be affected.

High-Speed Train Alternative

Both the HST alignment options and the conventional improvements would be located within existing rights-of-way and would need little right-of-way outside of existing rail corridors between LAX and San Diego. The improvements south of Irvine would be proposed to increase speed and to decrease travel time for a non-electric conventional rail technology similar to the existing intercity and commuter trains. Depending on the alignment and construction options for the high-speed and conventional rail improvements, a total of approximately 20 ac (8 ha) to 45 ac (18 ha) of new right-of-way would be needed outside existing rail corridors to accommodate proposed curve realignments, new stations along established rail routes, and/or some alignment options that would deviate from the existing LOSSAN corridor between Irvine and San Diego.

The conventional rail options include a number of proposed tunnels, which would avoid surface impacts on sensitive biological resources except at tunnel portal areas. The footprint of bridges across lagoons would not be increased with any of the improvements (refer to list of lagoons in the affected environment discussion in Section 3.15.2).

Based on the footprint of the bridges remaining constant, no sensitive vegetation would be impacted and only one ac (0.4 ha) to 2 ac (0.8 ha) of wetlands would be impacted. An estimated 14 to 17 special-status species would be impacted.

[7] Acres of right-of-way for the Modal Alternative are estimated based on the need for a minimum of 25 ft (8 m) of additional pavement width and 50 ft (15 m) of unpaved width for drainage, cut and fill, and other unpaved area, for the length of I-5 between Los Angeles and San Diego.

Alignment Option Comparisons

In a number of areas along the HST alignment options and the conventional improvement alignment, there are some discernible differences in potential impacts on biological resources depending on the alignment option.

High-Speed Train

LAUS and Irvine: There is not a major difference in potential impacts between the route along the LOSSAN corridor and the route along the UPRR corridor. While there appear to be more non-wetland waters in the study area of the LOSSAN corridor, most of the waters in this segment are contained within constructed channels in the urban environment. Therefore, no significant difference in potential impacts is indicated between these two potential corridor routes.

Conventional Improvements

San Juan Capistrano: The options are either a tunnel along I-5 or a combination of trench and at-grade alignment on the east side of Trabuco Creek. The tunnel along I-5 would have fewer potential impacts than the trench and at-grade option. While the trench and at-grade option could be routed to avoid direct impacts on the creek, the tunnel option would have less surface disturbance and would therefore affect fewer biological resources.

Dana Point/San Clemente: The options are a long or a short tunnel. The long tunnel would result in the least amount of surface disturbance and would eliminate the need for the realignment outside the LOSSAN right-of-way of the Dana Point Curve. Therefore, the long (two-segment) tunnel would result in fewer potential impacts than the short tunnel in this area.

Oceanside/Carlsbad and Encinitas/Solana Beach areas: There would not be a significant difference in potential impacts from the trench and at-grade options in either of these sections, because all options are along the existing LOSSAN corridor alignment in highly urbanized areas. Therefore, none of the options would be expected to result in potentially substantial impacts on biological resources.

Del Mar: The two options are tunnel alignments, one along I-5 and the other under Camino del Mar. The I-5 tunnel would avoid additional potential impacts on the Los Peñasquitos Lagoon (and would allow the removal of the existing rail bridge structure in the future), but the design concept would include a new, elevated structure along the south edge of San Dieguitos Lagoon, which may result in potential impacts on sensitive biological resources. The Camino del Mar tunnel would not result in new impacts and the new bridge would follow the existing bridge over Los Peñasquitos and San Dieguito lagoons. (There may be the opportunity to replace the existing bridge with a causeway structure that would increase the tidal flow and remove the embankment from the lagoons.) Overall, the Camino del Mar tunnel would likely have fewer potential impacts on biological resources associated with the lagoons, because it would not introduce new structures to the southern edge of San Dieguito Lagoon.

I-5/805 Split: There are two tunnel options. The Miramar Hill tunnel option would cross areas of coastal sage scrub, whereas the study area of the I-5 tunnel in this area does not. However, both tunnel alignments would reduce the amount of surface disturbance in the area, and both are in highly urbanized areas. The current level of data does not allow any significant differentiation between the potential impacts associated with these two tunnel options.

3.15.5 Mitigation Strategies

Potential strategies to mitigate impacts on biological resources would include field verification of sensitive resources and filling data gaps to allow designs to avoid impacts on special-status species and sensitive habitat areas. Consideration of participation in or contribution to existing or proposed conservation banks or natural management areas to mitigate potentially considerable impacts that could not be avoided would also be part of the potential mitigation during future project level analysis. Avoidance of potential

impacts may be achieved through project design changes to reduce the impact footprint or relocation of the sub-segments. For example, to avoid or minimize impacts in sensitive areas, alignment plans and profiles could be adjusted, or proposed structures could be constructed above grade or in tunnels. In addition, construction of wildlife underpasses, bridges, and/or large culverts, could be considered to facilitate known wildlife movement corridors. Wildlife crossings, such as those constructed for bobcat and coyote in San Bernardino for a highway project (National Cooperative Highway Research Program 2002), have been shown to be successful.

Special mitigation needs would be considered in the future with the appropriate authorities that are responsible for regional mitigation (conservation) banks, HCPs, NCCPs, or special area management plans. Mitigation may include consideration of acquisition, preservation, or restoration of habitats, or relocation of sensitive species. Specific mitigation measures would be identified at the project level of environmental review.

Consultation with the appropriate resource agencies to develop site-specific avoidance and minimization strategies would be incorporated in the project-level environmental review.

Resource agencies have expressed interest in helping to develop and participate in a mitigation planning and monitoring program to determine impacts and mitigation effectiveness for sensitive species in the lagoon areas. This approach could include site-specific baseline conditions, monitoring mitigation effectiveness as various proposed projects (highway and rail) are constructed, and adjusting mitigation measures as needed based on effectiveness and compatibility with lagoon restoration programs.

3.15.6 Subsequent Analysis

Identification of potential impacts on various biological resources for this Program EIR/EIS has primarily relied on the available GIS database, other GIS tools, and review of available literature. These sources encompass a broad range of information that may not exactly correspond to actual field conditions. Project-level studies would be required to obtain more reliable assessments of potential impacts on biological resources in the study area.

The subsequent biological resources analyses required for project environmental documentation would focus on project-specific impacts that reflect more precise definitions of the right-of-way, the proposed facility locations, and the operations. Areas of possible further study include the following.

- Field surveys to determine the extent and type of general and sensitive biological resources, including focused surveys following resource agency protocols for special-status species.
- Mapping of plant communities and sensitive biological resources within and adjacent to the proposed HST system right-of-way/impact footprint to address direct and indirect impacts on biological resources.
- Study of wildlife movement/migration corridors. Major wildlife movement/migration corridors within the study area have been identified. Field studies could identify additional locally significant corridors and provide data to assist in the design of bridges and wildlife crossings at crucial travel route points.
- Delineation of waters and wetlands to determine the extent of USACE and CDFG jurisdiction, and consultation conducted with these agencies regarding appropriate mitigation.
- Hydraulic analysis of lagoon crossings to identify potentially feasible improvements that may help improve tidal hydraulics and remove barriers to floodwaters.
- Consultation with USFWS, as needed, for potential impacts on federally listed plant and wildlife species, including the preparation of a biological assessment or assessments, and biological opinions for each phase of project implementation. Early consultation would help to refine appropriate mitigation strategies.

- Consultation with CDFG regarding potential impacts on state-listed plant and wildlife species and appropriate mitigation for such impacts. Early consultation would help to refine appropriate mitigation strategies.
- Assessment of potential for participation in HCPs.
- Development of a mitigation monitoring plan for environmental compliance during construction.
- Application for necessary permits (USACE Nationwide Permit or Section 404, USFWS Biological Opinion, CDFG consistency determination with USFWS Biological Opinion, and 1600 Streambed Alteration Agreement, RWQCB Section 401).